<u>Claims</u>

1. 1. A method of determining an input function for each of a plurality of clocked state
2.   holding elements, said method comprising the steps of:

3.   a. determining, for each element, a first Boolean function corresponding to
4.   variables forming an input to that element;

5.   b. determining a common gating function for the plurality of elements; and

6.   c. determining, for each element, a second Boolean function based on the first
7.   Boolean function and the common gating function, each said second Boolean
8.   function being determined such that it provides the same result as the
9.   respective first Boolean function when the common gating function has a
10.   value of 1, wherein each second Boolean function forms an input function for
11.   the respective element.

1. 2. The method according to claim 1 further comprising the step of selectively replacing
2.   each said first Boolean function with its respective second Boolean function.

1. 3. The method according to claim 2 wherein said step of selectively replacing is
2.   dependent upon a comparison of each first and respective second Boolean function
3.   to determine which is the most efficient function.

1. 4. The method according to claim 4 wherein the most efficient function is the one that
2.   can be implemented with a smaller number of implementation in terms of logical
3.   gates.

1. 5. The method according to claim 1 wherein the second Boolean function is created by
2.   applying an algorithm to the first Boolean function.

1. 6. The method of according to claim 5 wherein the algorithm creates a Karnaugh map.

1. 7. The method according to claim 1, wherein the elements have at least one common
2.   input and the gating function is determined by the steps of

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3   a.   determining, for each element, the conditions under which that element will

4   hold its current value based only on the common inputs ; and

5   b.   combining, for each element, the determined conditions to form the gating

6   function for that element.

1   8. The method according to claim 7 wherein the Boolean function for each element

2   determines the conditions under which the element will hold its current value.

1   9. The method of claim 1 wherein the recited steps are carried out by computer

2   software.

1   10. An apparatus for determining an input function for each of a plurality of clocked

2   state holding elements, comprising:

3   a.   means for determining, for each element, a first Boolean function

4   corresponding to variables forming an input to that element;

5   b.   means for determining a common gating function for each of the plurality of

6   elements; and

7   c.   means for determining, for each element, a second Boolean function based on

8   the first Boolean function and the common gating function, each said second

9   Boolean function being determined such that it provides the same result as

10   the respective first Boolean function when the common gating function has a

11   value of 1, wherein each second Boolean function forms an input function for

12   the respective element.

1   11. The apparatus according to claim 10 further comprising means for selectively

2   replacing each first Boolean function with its respective second Boolean function.

1   12. The apparatus according to claim 11 further including means for comparing each

2   first Boolean function to its respective second Boolean function to determine which

3   is the more efficient function and providing an output and wherein the means for

4   selectively replacing is dependent upon this output.

1   13. The apparatus according to claim 12 wherein the most efficient function is the one

2   that can be implemented with the smallest gating structure.

1   14. The apparatus according to claim 10, wherein the elements have at least one

2   common input and the gating function is determined by:

3   a. means for determining, for each element, the conditions under which the

4   element will hold its current value based only on the common inputs ; and

5   b. means for combining, for each element, the conditions to form the gating

6   function for that element.

1   15. A computer system comprising apparatus for determining a gating function for input

2   to one of a plurality of clocked state holding elements, said apparatus comprising:

3   a. means for determining, for each element, a first Boolean function

4   corresponding to variables forming an input to that element;

5   b. means for determining a gating function for each of the plurality of elements;

6   and

7   c. means for determining, for each element, a second Boolean function which

8   provides the same result as the first Boolean function when the gating

9   function has a value of 1.